MR

(X 456-6406)

THE WHITE HOUSE

WASHINGTON

December 29, 1987

MEMORANDUM FOR THE WORKING GROUP ON SPACE COMMERCIALIZATION

FROM: EUGENE J. McALLISTER EM

SUBJECT: Materials for December 30 Meeting

The materials for the December 30 meeting of the Working Group on Space Commercialization are attached.

I would like to consider the following items, in this order:

1. A Federal commitment to the ISF -- proposal 11 in the paper to the Economic Policy Council;

2. proposal 2 in the paper to the EPC;

3. proposal 14;

4. proposals 15 and 16;

5. proposal 13;

6. proposal 8; and

7. the insurance proposals.

Please be sure to bring the memorandum to the EPC to work from during this meeting.

OMB / NASA / Commerce draft

527
December 28, 1987

POTENTIAL DEMAND FOR THE INDUSTRIAL SPACE FACILITY (ISF)

The Commercial Space Working Group of the EPC asked NASA, Commerce and OMB to assess the potential demand for the ISF, if the Federal Government committed to support an early 1990's launch of the facility. This paper responds to that request. It summarizes the results of a quick, informal survey of the Federal research agencies. The paper also summarizes the costs and benefits of the ISF.

Federal Agency Demand for ISF (Summary)

-- NASA, DOD (USAF and SDIO), and DOE and DOC (NBS) identified specific candidate experiments that could be placed on ISF. Commerce also received expressions of interest from 6 private companies.

-- NSF indicated that it would likely receive proposals for ISF experiments if the facility were available.

-- More detailed information on possible Federal agency utilization of the ISF is attached.

-- A few of the possible NASA experiments have some initial funding for Spacelab/Space Station use. The DOD, DOE and NSF experiments are not funded, but could compete for funding within currently approved and funded programs.

-- It was not possible, given the limited ISF information available, to make a quantitative estimate of the degree of utilization of ISF under a 5-year lease of 70 percent of an ISF module.

-- The information on demand was gathered directly from the agencies. It does not include Space Industries, Incorporated (ISF builders) assessment of the demand information they have gathered thus far either from the Federal agencies or from private companies.

-- The data on demand for ISF are not of the quality normally used in making budget decisions. However, this situation is not surprising, since there currently is no firm commitment

that ISF will be available in the early 1990's. By comparison, the proposed experiments for Space Station have been identified to a much greater extent and in more detail. NASA has spent 3 years planning to accommodate those experiments on Space Station (at a cumulative cost of $40 million) since the President's decision in late 1984.

Costs of ISF

-- Capital investment for the first ISF module is estimated to cost $706 million in 1987 constant dollars. To date, the private sponsors have invested $22 million in planning and design. The sponsors plan to raise $475 million in debt financing and $231 million in equity participation.

-- The requested Federal Government commitment of $140 million per year (1987 $) for 5 years would allow financing to proceed. In return for this commitment, the Government would have access to approximately 70 percent of the initial ISF module.

-- NASA had already agreed to provide three initial launch and servicing shuttle flights on a delayed payback basis (12 percent of revenues) prior to the Challenger accident.

-- These costs do not include the additional costs of developing or modifying federally-sponsored experiments to be flown on an automated ISF, or for outfitting ISF to accommodate these experiments. These costs cannot be estimated at this time. However, for Space Station:

  o NASA has spent about $40 million to date on Space Station experiment accommodation planning.

  o Over the next 5 years, NASA currently estimates costs of about $500 million for development of specific science payloads for the Space Station.

-- Given the current Space Station schedule, funding for experiments and outfitting the ISF would increase budget outlays significantly in the near term because of its earlier availability than Space Station and because it add to rather than replace Space Station capabilities. However, recognizing recent Congressional action it is likely that the Space Station schedule may slip, allowing some funds to be reprogrammed in support of the ISF.

Benefits of the ISF

-- The ISF is a on-orbit facility which can provide power, ground communications, and a very low gravity environment for both research and commercial opportunities. The Space Shuttle will dock with the ISF periodically to change and service experiments. The ISF could be much more conducive than the Space Station for experiments requiring long-term low gravity conditions since the ISF will operate autonomously for long periods of time on-orbit without either astronauts or other activities disturbing the ISF gravity environment. Because of this infrequent servicing, these experiments will need to be sufficiently automated.

-- The ISF could expand the opportunities for academic, Federal agency, and commercial on-orbit experiments in materials, biological, and remote sensing research.

-- However, most of these on-orbit research efforts are in their infancy and it would be extremely speculative to quantify the commercial benefit of experiments planned for the 1990's.

-- NASA states that it has no requirement for the experiments that could be supported on ISF in the 199-1995 time period. This conclusion stems from NASA's initial strategy of reliance on man-operated microgravity research, which NASA believes to be the most effective approach, given the experimental nature of this emerging field. NASA believes that a logical strategy of manned microgravity research consists of short-term experiments in the Space Shuttle, Spacelab and possibly Spacehab; leading to longer duration experiments on the proposed extended duration orbiter (EDO); finally leading to long-term experiments on Space Station.

-- Commerce reports that industry researchers state that the proposed ISF will permit levels of microgravity which could be far superior to those possible on either Spacehab or the extended duration orbiter. This lower level of microgravity, which is more desirable for producing high-quality materials, is possible by the very nature of the ISF, which being man-tended is not subject to the "gravity flutters" of man-occupied space research facilities. A man-tended facility is, therefore, unique and an important part of a space hardware infrastructure.

-- NASA believes that long-term automated experiments (as would be supported by ISF) would follow logically from manned experiments on the Space Station.

-- However, Westinghouse (a partner in ISF) projects that, with current in-house technology, it can reduce the requirement for manned involvement "in the loop" in ISF experiments to 25% by 1994. Other industry analyses have shown ISF to be cheaper per experiment than shuttle based systems (such as Spacelab and Spacehab) by a factor of 20 or more.

-- NASA would acknowledge that an ISF would have nearer term benefit in supporting certain limited types of experiments not ideal for Space Station.

-- NASA also acknowledges that ISF, if deployed in the early 1990's, have benefits in Space Station operational "check-out." This would help assure that performance goals for the Space Station are quickly met.

Attachment

POTENTIAL AGENCY DEMAND FOR THE ISF

NASA.--In response to a Congressional request for a report by December 31, NASA has undertaken a "bottoms-up" review of its potential requirements for ISF. NASA believes that it has no requirement for ISF, but if it were available, NASA would make use of the facility. The NASA review indicated 14 planned experiments in materials, life sciences and advanced technology that could be conducted on ISF, 16 candidate experiments from JEA's and CCDS, and an undefined number of experiments in support of Space Station operations. Some of these experiments are currently planned for Space Station and have limited funding.

The NASA assessment generally reflects the results of previous studies conducted within NASA. However, the assessment may not fully reflect all of the possible proposals under review in a consultant study for the NASA Office of Commercial Programs by Teledyne Brown Engineering. This study will be completed in January 1988.

DOD.--In a letter of December 9, 1987 to Representative Aspen, Assistant Secretary Welch indicated that 5 of 100 experiments under consideration in the Space Test Program (STP) could directly benefit from ISF. None are currently funded. The Strategic Defense Initiative Office (SDIO) informally advised OMB that it would be interested in sponsoring 3-4 experiments per year on ISF.

NSF.--NSF informally indicated that they have no specific current plans for the use of the ISF. NSF has received interest from academic researchers for materials science research, biological research, and earth observations that would benefit from an ISF-type space facility, depending on the cost of such a facility.

DOE.--Six DOE National laboratories indicated a total of 27 proposed experiments that could be placed on ISF, 3 of which are classified. None of the 27 experiments are currently funded, but all 27 are within approved DOE programs and could compete for future funding in their respective program areas.

Commerce.--The National Bureau of Standards (NBS) indicated an interest in 7 proposed materials processing experiments and 4 proposed experiments to test theories about various processes. In addition, Commerce has received expressions of interest from six companies in sponsoring experiments on the ISF. The extent

of interest is not known, and there are no firm commitments. The six companies are:

-- Microgravity Research Associates, Inc.;
-- International Space Corporation;
-- Instrumentation Technology Association, Inc.;
-- 3M Corporation;
-- McDonnell Douglas Astronautics Company;
-- Boeing Aerospace Company; and
-- Payload Systems, Inc.

International Competition.--The ISF could play a major role in allowing U.S. researchers and industry to remain competitive with both our allies and with the Soviet Union in the ten years prior to the availability of the U.S. Space Station. The Europeans have set aside 30% of the 1991 Spacelab D-2 mission for commercial research. The Japanese are developing, with commercial investment, their own free-flyer platform which will be launched by either the unmanned H-2 launch vehicle or by the Space Shuttle. The Chinese have announced their own 22-ton space station, which is planned to be in orbit by 1998. The Soviets are planning to deploy a man-tended module similar to the ISF, in addition, of course, to their current operational status of two space stations.

NASA draft

Proposal 2

NASA will establish an organization to encourage a broad range of microgravity research opportunities for government agencies, commercial firms and universities. A senior-level advisory group will be established to ensure that Federal agencies other than NASA, such as NSF, NIH and NBS participate fully in the activities of the organization.

The new organization will have among its activities the following:

a. serving as a central clearing house for information about microgravity research requirements, results and opportunities;

b. facilitating Federal, university and commercial researchers' access to necessary support services, including assistance on payload design, integration and testing;

c. facilitating access to limited in-space research opportunities for payloads selected through peer review;

d. encouraging and facilitating use of vehicles and facilities that offer microgravity opportunities e.g., Spacelab, EDO, Space Station, Spacehab, ISF; and

e. examining and making recommendations on proposals, such as a Federal commercial launch voucher program, that could enable agencies to fund broader levels of microgravity research.

Discussion: NASA believes that successful implementation of this proposal requires that a specific Federal agency be assigned responsibility for bringing it into being and be held accountable for its performance. NASA has a long and successful history of fostering teamwork between Government, private enterprise and the academic community in space research. In fact, NASA is the only Federal agency with extensive experience and an existing network of institutions and activities in this area.

In its Centers for the Commercial Development of Space (CCDS), 16 universities and over 100 companies work with NASA in developing R&D programs for eventual space commercialization. Looking ahead, NASA has already established a Science Users Management Committee to plan, coordinate and oversee science activities, including microgravity research, on the Space Station. This Committee incorporates representatives from other federal agencies, including NBS, NSF, USGS, USDA and NOAA. NASA also has an extensive set of space science and applications advisory groups, which draw upon the finest talent available in the

private and university sectors. As a matter of sound practice, NASA routinely subjects research proposals to outside peer review. To further enhance its commercial activities, NASA has stepped up its outreach program. At just one recent conference in Nashville, over 140 participants from academia and industry, including many from non-aerospace firms, generated over 100 suggestions for improving the commercial space research environment.

One conclusion shared by virtually all knowledgeable observers is that sound progress requires industry and university access to specialized laboratories, experiment hardware, test facilities, integration expertise, and flight hardware. NASA has over 200 laboratories, distributed among its seven field center installations immediately available to support Federal-industry-university research. NASA is the only Federal agency capable of providing assistance across the full range of microgravity research requirements: from design of experiment, through testing and integration, to in-space operations, including extensive experiment and failure-recovery capabilities.

The most productive course for the Federal Government to take is to build upon this existing infrastructure and experience base. Creating an organization in another agency with whom the private sector and the academic community would have to work will only complicate and delay a process already well begun.

Establishment of the proposed Federal-industry-university organization can be done by NASA under existing authority. To ensure that the views and interests of all parties--governmental and private--are taken into account, NASA will establish a high-level advisory group with senior representatives from all involved federal agencies and from a cross-section of participating commercial firms and universities. The group would advise NASA top management on operations of the new organization, help to resolve disagreements over priorities and objectives, and ensure that all microgravity research interests are fairly represented. This approach, which NASA strongly recommends, balances two sets of requirements: 1) that the new organization have clear day-to-day direction from a qualified agency in a manner which complements rather than competes with or duplicates existing programs and capabilities; and 2) that the organization be representative of the full range of interests and requirements that it is designed to encourage and serve.

CEA draft

Proposal on INTELSAT and the Separate Satellite Systems Policy

The government will foster a more competitive environment in satellite telecommunications by lifting the restrictions on separate satellite system access to the "public switch network."

- The public switch network (PSN) is essentially the telephone, telegraph, and telex connection network. Current U.S. policy excludes U.S. separate satellite systems and those terminating in the U.S. from the PSN to which INTELSAT has access. Cable networks providing identical services, however, are not excluded. In addition, private satellites that provide primarily U.S. domestic service have been given permission through the INTELSAT consultation process to operate between the U.S., Canada, Mexico, and the Caribbean.

- Separate international satellite systems cannot have access to or provide their own customers access to INTELSAT's large global customer base. This policy protects INTELSAT's telephone, telegraph, and telex market and severely disadvantages private communication satellite systems, such as PanAmSat, which are trying to provide international services. PaAmSat has a service agreement with Peru, and a key obstacle to signing on countries such as the Dominican Republic is that PanAmSat cannot offer telephone and telex connections to the U.S. Other nations have also expressed serious interest in purchasing telecommunications services from PanAmSat if it can provide interconnections to the U.S. PSN.

- Presidential Determination 85-2 stating that "separate satellite communications systems are required in the national interest" instructed the Secretaries of State and Commerce to develop the criteria for authorizing such systems. Their letter to the FCC embodies the separate systems policy excluding separate systems from the PSN. The Senate Report on the Foreign Relations Authorization Act for FY 1987 states that the President will review the Determination "from time to time...to ensure an efficient and responsive international telecommunications system." While no Congressional action is needed to alter this policy, a reversal of the position in the letter of November 28, 1984 from the Secretaries of State and Commerce to the FCC would be necessary.

- These alterations in domestic policy should not entail any abrogation of United States obligations under the INTELSAT treaty.

PRO: - This would remove the United States support for a monopoly position of INTELSAT with respect to the PSN.

- Permitting private separate satellite systems to offer connections to the U.S. telephone and telex network would significantly enhance their ability to convince other nations to use their systems and to end exclusive use of INTELSAT.

- A number of domestic satellite systems compete to provide U.S. service, and this rivalry results in high quality service at low prices. A competitive international system would presumably achieve lower costs and greater efficiency than the current system.

- PanAmSat wants to offer service to Peru and other nations at lower cost than INTELSAT, thereby bringing benefits to developing countries.

- The policy change would not require Congressional action.

CON: - The Secretaries of State and Commerce developed the restrictions on separate system access to the PSN only three years ago.

- The U.S. is primarily responsible for the formation of INTELSAT -- for a variety of economic, political, and foreign policy objectives -- not the least of which was to promote a Western global system rather than use of INTERSPUTNIK.

- The United States has recently completed a successful political effort to elect a U.S. Director General (Dean Busch) to head the INTELSAT organization.

- The proposal could be counter productive rather than achieving the objective; i.e., it may harden PTT's opposition to U.S. separate systems. Progress is being slowly made and the U.S. Executive Branch is reviewing the policy.

OMB - NASA draft

December 28, 1987

Proposal 15: NASA will, in consultation with OMB, review and revise its Guidelines on commercialization of the Space Station to reaffirm, clarify and strengthen its commitment to private sector investment in the Space Station program.

To underscore this commitment, NASA will take steps to provide the greatest possible dissemination of the Guidelines including a Statement in the Commerce Business Daily early in 1988.

The revised Guidelines will include the following elements: (1) a clear statement of policy; (2) criteria for evaluating privatization and commercial proposals; (3) procedures for submitting and reviewing these proposals. Among the criteria NASA will consider in evaluating proposals are the amount of private sector investment proposed, the degree of risk sharing, cost effectiveness and the proposal's conformity with performance, safety and schedule requirements.

NASA has already solicited and received proposals for Commercial involvement in the development of the approved Phase I Space Station. These proposals will be carefully considered in the preliminary requirements review (PRR). NASA will give positive consideration to proposals to accelerate private sector investment in Space Station development and operations in the form of either goods or services not already contracted for. Areas which appear especially suitable for commercialization/privatization include:

- -- Logistics services
  - o fluid resupply
  - o waste disposal
  - o produce changeout and return
- -- Logistics vehicles and carriers
- -- Payload checkout facilities and services
- -- Man-tended free flying laboratories
- -- Orbital storage facilities
- -- Co-orbiting experiment and applications platforms
- -- Repair, calibration and test facilities and/or services.

Where private sector investment capabilities are insufficient, joint Government-industry ventures could also be considered. In all cases, the commercial partner would own all rights to resulting technologies, with royalty-free use by the Government for its own purposes.

OMB draft

December 28, 1987

Proposal 16: NASA will adopt a policy of promoting privatization of all future Space Station requirements under study but not yet approved.

This policy would apply to:

-- Crew Emergency Return Vehicle (CERV).--If approved, NASA will announce performance safety and schedule requirements, and provide an opportunity for the CERV to be designed, built, and operated by the commercial sector. (Note: A decision to build the CERV may be pending for some months yet.)

-- Heavy lift launch services.--NASA will announce its intention to seek private sector heavy lift launch services for assembly of the Space Station where such services are cost effective relative to shuttle launches and subject to established NASA criteria including operational, safety and schedule requirements. This solicitation would be separate from, and would not interfere with, the joint NASA/DOD program for an Advanced Launch System. (Note: NASA is currently undertaking several studies of a possible Shuttle-derived heavy lift launch vehicle for launching Space Station components.)

-- Evolution of the Space Station beyond the Block I configuration.